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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR    | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|-------------------------|---------------------|------------------|
| 09/755,858      | 01/05/2001  | Lawrence Yium-Chee Chiu | ARC920000054US1     | 3691             |

22462 7590 04/19/2002

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EXAMINER

MCLEAN, KIMBERLY N

ART UNIT

PAPER NUMBER

2187

DATE MAILED: 04/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/755,858

Applicant(s)

CHIU ET AL.

Examiner

Kimberly N. McLean

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. The enclosed detailed action is in response to the Information Disclosure Statement and the Application submitted on January 5, 2001.

#### ***Specification***

2. The abstract of the disclosure is objected to because of the following informalities:

Line 1, delete "To address the requirements described above".

Line 2 change "and a locking" to "for implementing a locking".

Lines 2-3 change "for supporting parity protected RAID in a clustered environment" to "for supporting parity protection in a RAID clustered environment".

Correction is required. See MPEP § 608.01(b).

3. The following title is suggested:

"Method and Apparatus for Supporting Parity Protection in a RAID Clustered Environment".

#### ***Claim Objections***

4. Claims 1, 3, 6-9, 12-17, 19 and 22-24 are objected to because of the following informalities:

Claim 1, Line 5, Claim 9, Line 10 and Claim 17, Line 5 change, "the parity" to "the parity data".

Claim 3, Line 1, Claim 19, Line 2 states "RELEASE command". Should this state, "RELEASE command" ?

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Claim 1, Line 9, Claim 6, Line 1, Claim 7, Line 1, Claim 8, line 1, Claim 9, Line 13, Claim 14, Line 1, Claim 15, Line 1, Claim 16, Line 1, Claim 17, Line 9, Claim 22, Line 1, Claim 23, Line 1 and Claim 24, Line 1, change "RAID system" to "RAID clustered system".

Claim 9, Line 6 change "(b)" to "(c)".

Claim 9, Line 6 change "the SCSI devices" to "the plurality of SCSI devices".

Claim 9, Line 7 change "the data storage devices" to "the plurality of SCSI devices".

Claim 9, Line 10 change "the lock" to "a lock".

Claim 12, Line 2 and Claim 13, Line 2 change "the logic" to "logic".

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

6. Claims 1-4, 7, 9-13, 15 and 17<sup>18-20, 23</sup> are rejected under 35 U.S.C. 102(e) as being anticipated by Hodges (USPN: 6,219,751 B1).

Regarding claims 1 and 17, Hodges discloses a method of updating parity data in a RAID clustered environment comprising locking parity data (via Read/lock command), without communicating with other nodes, for data managed in SCSI (small computer system interface)

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disks in a RAID clustered system (C 6, L 61-67; C 7, L 1-13, L 52-55 – the RAID storage devices are accessible from multiple nodes [clustered environment]), wherein locking prevents other nodes from modifying the parity (C 3, L 19-26 – a node is not allowed to access parity data until it is granted a lock); reading the parity data (C 7, L 54-57, L 61-63); generating new parity data (C 7, L 63) by exclusive oring data from a first node (Figure 2b, References 301, 202A)(new/updated data from the first node; C 7, L 58-60) (C 7, L 63; C 2, L 23-25) and a second node (Figure 2B, References 327, 202B)(old parity data and old data stored in the disk by the second node – C 7, L 58, L 61; C 2, L 23-25); writing the parity data to a SCSI disk in the RAID system (C 7, L 63-64); and unlocking the parity (C 7, L 65-67- release/lock command; C 7, L 33-39).

Additionally, with respect to claim 17, Hodges discloses an article of manufacture, embodying logic to perform the above method steps of updating parity data in a RAID clustered environment (Figure 2B; C 12, L 57-67; C 13, L 1-19).

Regarding claims 2, 4, 18 and 20, Hodges discloses the locking step comprising issuing a RESERVE command (read/lock command is used to lock the parity data ) (C 6, L 61-67; C 7, L 1-13) and combining the locking and reading steps (**claims 4, 20**; C 7, L 1-13 – second approach, C 7, L 52-57).

Regarding claims 3 and 19, Hodges discloses the unlocking step comprising issuing a RELEASE command (release/lock command is used to unlock the parity data)(C 7, L 33-39).

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Regarding claims 7 and 23, Hodges discloses a RAID 5 system (C 3, L 26-27).

Regarding claim 9, Hodges discloses an apparatus (Figure 2B) for updating parity data in a RAID clustered environment comprising a plurality of SCSI storage devices in a RAID clustered system (Figure 2B, References 307, 309, 311, 313, 315, 317, 319, 321; C 5, L 60-67 – the storage devices are configured as RAID arrays and are accessible by multiple nodes [RAID clustered environment]); data stored in the plurality of SCSI storage devices (inherent); a first node, (Figure 2B, Reference 301 and 202A), operatively coupled to the SCSI storage devices (via Reference 209A in Figure 2B), that manages storage and retrieval of the data in the data storage devices (the node comprises a RAID controller, Figure 2B - Reference 202A, which manages storage and retrieval of data in the storage devices) wherein the first node is configured (C 7, L 46-50) to lock parity data (via Read/lock command), without communicating with other nodes, (C 6, L 61-67; C 7, L 1-13, L 52-55), wherein locking prevents other nodes from modifying the parity (C 3, L 19-26 – a node is not allowed to access parity data until it is granted a lock); reading the parity data (C 7, L 54-57, L 61-63); generating new parity data (C 7, L 63) by exclusive oring data from two nodes (a first node - new/updated data from the first node; C 7, L 58-60; C 7, L 63; C 2, L 23-25 and a second node, Figure 2B, References 327, 202B - old parity data and old data stored in the disk by the second node; C 7, L 58, L 61; C 2, L 23-25); writing the parity data to a SCSI disk in the RAID system (C 7, L 63-64); and unlocking the parity (C 7, L 65-67 - release/lock command; C 7, L 33-39).

Claim 10 is rejected for the same rationale applied to claim 2 above.

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Claim 11 is rejected for the same rationale applied to claim 3 above.

Regarding claim 12, Hodges discloses the first node combining the logic for reading and locking (C 7, L 46-50 – Hodges teaches that the control unit, (Figure B, Reference 202A), performs the reading and locking and thus contains the logic for reading and locking. Hence, the logic for reading and locking is combined in the control unit.

Regarding claim 13, Hodges discloses the first node combining the logic for writing and unlocking (C 7, L 46-50 – Hodges teaches that the control unit, (Figure 2B, Reference 202A performs the functions above and thus also contains the logic for performing the functions above. Hence the logic for writing and unlocking is combined in the control unit).

Claim 15 is rejected for the same rationale applied to claim 7 above.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hodges (USPN: 6,219,751 B1) in view of Abe (USPN: 5,450,600).

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Hodges discloses the limitations cited above in claims 1 and 17, however, Hodges does not disclose combining the writing and unlocking steps above. Abe teaches the concept of combining commands{steps} (integrating basic commands into an integrated command) and the command operations (integrated command – C 5, L 22-68; C 6, L 1-11). Abe teaches that this feature improves command operations by simplification (C 17, L 49-50). Hence, one of ordinary skill in the art would have recognized the benefits of Abe's teachings and would have been motivated to use these teachings with the teachings of Hodges for the desirable purpose of simplification.

9. Claims 6, 14 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hodges (USPN: 6,219,751 B1) in view of IBM Technical Disclosure Bulletin "Limited Distributed DASD Checksum".

Hodges discloses the limitations cited above in claims 1, 9 and 17, however, Hodges does not disclose a RAID 4 system. The IBM Technical Disclosure Bulletin discloses a RAID 4 system (Figure 1). Additionally, the IBM Technical Disclosure Bulletin discloses that adding or removing units to a RAID 4 system is relatively simple because the change does not affect the other units (Lines 14-16) as compared to RAID 5 systems (taught by Hodges). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a RAID 4 system in the system taught by Hodges for the desirable purpose of simplification (providing a simpler means for adding or removing units to the RAID system).

10. Claims 8, 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hodges (USPN: 6,219,751 B1) in view of Lyons (USPN: 6,101,615).



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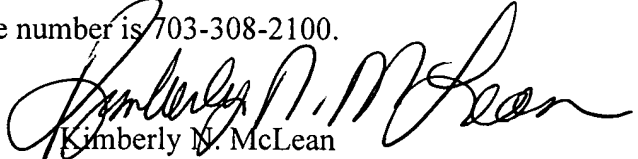
Hodges discloses the limitations cited above in claims 1, 9 and 17, however, Hodges does not disclose a RAID 6 system. Lyons discloses a RAID 6 system (Figure 5). Lyons discloses that a RAID 6 system improves the data protection of RAID 5 (which is used in the system taught by Hodges) by providing two parity drives (C 1, L 49-50). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a RAID 6 system in the system taught by Hodges for the desirable purpose of increased data protection and reliability.

### *Conclusion*

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly N. McLean whose telephone number is 703-308-9592. The examiner can normally be reached on M-F (9:00 - 6:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Do Yoo can be reached on 703-308-4908. The fax phone numbers for the organization where this application or proceeding is assigned are 703-7467329 for regular communications and 703-746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-2100.

  
Kimberly N. McLean  
Examiner  
Art Unit 2187

KNM  
April 19, 2002